

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1 1. A method for validating a specific device configuration when the set of all
2 valid configurations is too large to practically enumerate, comprising the steps
3 of:

4 selecting a set of components to be included in the device
5 configuration, wherein the set has a single base component having only sink
6 interfaces;

7 defining an interface for each component, wherein each component is
8 characterized as having a source or a sink interface and properties associated
9 with the interface; and

10 establishing connections between components having source and sink
11 interfaces with matching properties.

1 2. The method recited in claim 1, wherein the properties comprise a direction,
2 a capacity, and a characterization properties.

1 3. The method recited in claim 2, wherein the direction property characterizes
2 an interface as a source or sink interface.

1 4. The method recited in claim 2, wherein the capacity property is represented
2 as a cardinality associated with a number of sink connection instances it
3 supports or source instances it requires.

1 5. The method recited in claim 2, wherein the capacity property is represented
2 as a continuous quantity that may be apportioned among connected interfaces.

1 6. The method recited in claim 2, wherein the characterization property
2 defines a purpose and operation of the interface.

1 7. The method recited in claim 6, wherein the characterization property
2 includes values associated with the interface.

1 8. The method recited in claim 1, further comprising the step of validating
2 connections between components.

1 9. The method recited in claim 8, wherein the step of validating comprises the
2 steps of:

3 verifying that the sink capacity is greater than or equal to the source
4 capacity;

5 verifying that for each source property there is one sink property with
6 the same value; and

7 verifying that for each sink property there is one source property with
8 the same value.

1 10. The method recited in claim 8, wherein a connection between source and
2 sink components remains valid if one of the components has either a capacity
3 property or a characterization property, and the corresponding interface
4 component does not have a corresponding capacity property or
5 characterization property.

1 11. The method as recited in claim 1, wherein the step of selecting comprises
2 the steps of:

3 identifying the base component in the set with only sink interfaces;
4 searching the set for a component whose source interfaces match an
5 open sink interface;
6 creating a connection between the matching interfaces of the sink
7 component and the component found in the searching step;
8 searching the set for a component having an open source interface and,
9 if found, searching the set for a component having a matching sink interface
10 and, if found, creating a connection between the component having the open
11 source interface and the component having the matching sink interface; and
12 repeating the steps of creating and searching until either there are no
13 components left in the set or there are no source interfaces in the set that
14 match a sink interface.

1 12. The method as recited in claim 11, further comprising the step validating
2 the configuration, wherein the configuration is valid if there are no
3 components left in the set and there are no open source interfaces.

1 13. The method as recited in claim 1, wherein a partial configuration of the
2 specific device is defined as an open source or sink interface, further
3 comprising the step of introducing into the device configuration an
4 environment component that defines an intended environment of the
5 configuration through a set of interfaces.

1 14. The method as recited in claim 13, wherein the partial configuration of the
2 specific device is an open source interface and the environment component
3 includes a matching sink interface.

1 15. The method as recited in claim 13, wherein the partial configuration of the
2 specific device is an open sink interface and the environment component
3 includes a matching source interface.

Sub A/ 1 16. The method as recited in claim 1, wherein a component of the specific
2 device is a logical component that defines the external specification of a
3 configuration when the specification refers to objective, measurable properties
4 of the configuration.

1 17. The method as recited in claim 16, wherein the logical component
2 comprises at least one sink interface that, in a valid configuration, will be
3 connected to a logical or functional source interface of some other component
4 within the device configuration.